

Application No. 10/553,689
Amendment Dated: October 31, 2007
Reply to Final Office Action of October 10, 2007

REMARKS

Applicants respectfully request that the application be reconsidered in light of the above amendments and the following remarks.

Claims 1-21 are pending. Claims 1 and 12 have been amended. No claims have been cancelled. New Claims 14-21 have been added.

Claim 1 has been amended to further clarify that the molar ratio of the Lewis Acid to the electron donor in the catalyst precursor is about 0.1:1 to about 0.3:1, and that the molar ratio of the Lewis Acid to the electron donor after the additional amount of activator is added is about 2:1 to about 50:1. Support for this amendment may be found, for example, at Page 18, lines 23-34 of the Specification. Claim 1 has also been amended to further clarify that the catalyst is partially pre-activated in step (5) for a short period of time of about 1 minute to about 6 hours to minimize deactivation of the catalyst prior to the transferring step (6). Support for this amendment may be found, for example, at Page 14, lines 4-7 and in the inventive Examples.

Claim 12 has been amended to further clarify that the activator is a Lewis Acid having the formula $M'(R''_n)X_{(3-n)}$ wherein M' is aluminum; each X is independently chlorine, bromine, or iodine; each R'' is independently a saturated aliphatic hydrocarbon radical having 1 to 14 carbon atoms; and n is 1 to 3. Support for this amendment may be found, for example, in Example 5, which exemplifies the use of tri-*n*-hexyl aluminum, which is listed as an example of the preferred Lewis acid activators disclosed on Page 13, lines 2-11 of the Specification.

New Claims 14-21 have been added to further limit the presently claimed invention to a process comprising a single polymerization reactor, and to further limit the additional amount of activator added to the polymerization reactor. Support for these claims may be found, for example, in Claim 10 as originally filed; at Page 16, line 10 to Page 17, line 12; at Page 18, lines 30-31, and in the Examples of the Specification.

Accordingly, no new matter has been added.

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Claim Rejections Under 35 USC §112, first paragraph

Claims 1-13 have been rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement for the reasons stated on page 2 of the Action. In order to expedite prosecution, Applicants have amended Claim 1 to further clarify that the catalyst is preactivated for a short residence time of about 1 minute to about 6 hours. Applicants have also deleted the limitation directed to the density of the polymer formed. Withdrawal of the rejection is respectfully requested.

Applicants have amended Claim 12 to further clarify that the activator is a Lewis acid comprising a tri-substituted aluminum compound according to the formula disclosed on Page 13, lines 1-11. Example 5 discloses the recited pre-activation time limitation in conjunction with the use of tri-n-hexyl aluminum as the Lewis acid, which is listed as a preferred Lewis acid according to the formula disclosed on Page 13, lines 1-11. Removal of the rejections are respectfully requested.

Claim Rejections Under 35 USC §103

Claims 1-13 have been rejected under 35 USC §103 (a) as being unpatentable in view of U.S. Patent Number 6,617,405 to Jorgensen (hereinafter Jorgensen-405) in view of U.S. Patent Number 4,349,648 to Jorgensen (hereinafter Jorgensen-648) for the reasons stated on pages 3-5 of the Action.

Applicants respectfully disagree in light of the amended claims. Applicants have amended the subject claims to further clarify that the catalyst precursor is only partially preactivated (i.e., wherein the molar ratio of the Lewis Acid to the electron donor in the catalyst precursor is about 0.1:1 to about 0.3:1) prior to addition of the catalyst slurry to the reactor, and that the catalyst is preactivated for a short residence time to minimize deactivation of the catalyst. As noted by the Action, Jorgensen-405 discloses the essentially complete activation of the precursor is carried out prior to introduction of the precursor into the reactor.

In Examples 1-4, Jorgensen-405 discloses a catalyst precursor preactivated using about 0.2 mole of a first activator and 0.45 moles of a second activator for a total of 0.65 moles activator per mole of electron donor (see Col. 12, lines 1-13, Jorgensen-405.), Jorgensen-405 is thus outside of Applicants recited range of 0.1:1 to 0.3:1.

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Jorgensen-405 further discloses "[a]dditional activator is fed to provide for sufficient activation of the catalyst plus a small additional amount to scavenge impurities in the polymerization reactor. The total amount of the additional "topping off" activator can be about 0.1 to about 75 percent by mol of the total amount of the activator used for the activation of the precursor. Addition of all the activator to the catalyst precursor eliminates mass transfer problems, which would prevent the activator from reaching the catalyst precursor if separate addition to the reactor was practiced" (see Col. 7, lines 17 to 26.)

Accordingly, Jorgensen-405 is directed to essentially complete activation followed by topping off of the reactor to ensure complete activation. This is in direct contrast to the subject claims, wherein the catalyst precursor is only partially activated to between 0.1 to 0.3 moles of activator to electron donor, and then fully activated in the reactor with the addition of between 2 moles to 50 moles of activator added per mole of electron donor, which is exactly the converse of the teachings of Jorgensen-405. As such, Jorgensen-405 actually teaches away from the subject claims.

Jorgensen-648 is generally directed to a process to copolymerize ethylene with other alpha olefins to produce copolymers having improved optical properties in film form. The Action cites Jorgensen-648 for the teachings directed to controlling density of ethylene copolymers by regulating the amount of comonomer for a given melt index. Applicants' have amended Claim 1 removing the density limitation.

Furthermore, both Jorgensen-405 and Jorgensen-648 are each directed to processes which comprise two reactors. As such, neither reference discloses or suggests a process comprising a single, sole polymerization reactor.

Jorgensen-405 and/or Jorgensen-648, either alone or in combination, fail to disclose or suggest all the limitations recited in Applicants' presently claimed invention. In fact, Jorgensen actually teaches away from Applicants' presently claimed invention. Accordingly, Applicants respectfully submit that Jorgensen-405 in view of Jorgensen-648 fail to render the subject claims obvious. Applicants respectfully request that the rejection be withdrawn.

Claims 1-13 have been rejected under 35 USC §103 (a) as being unpatentable over U.S. Patent Number 6,187,866 to Jorgensen et al. (hereinafter Jorgensen-866) in view of U.S. Patent Number 4,349,648 to Jorgensen (hereinafter Jorgensen-648.) Applicants respectfully disagree.

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Jorgensen-866 is directed to a process which produces low-density polymers. At Col. 2, line 65 to Col. 3, line 32, and likewise at Col. 6, lines 29-50, Jorgensen-866 discloses partial activation of the catalyst precursor from 0.1:1 to 1:1. In Examples 1-8, Jorgensen-866 exemplifies a partial activation of 0.75:1 (see Col. 13, lines 43-46.) Similar to Jorgensen-405, Jorgensen-866 also fails to disclose or suggest addition of a catalyst precursor which is only partially activated to between 0.1 to 0.3 moles of activator to electron donor, and then fully activated in the reactor with the addition of between 2 moles to 50 moles of activator added per mole of electron donor. As such, Jorgensen-866 fails to disclose or suggest all the claim elements. As discussed above, Jorgensen-648 fails to cure the defects in Jorgensen-866. Furthermore, both Jorgensen-866 and Jorgensen-648 are each directed to processes utilizing two reactors. As such, neither reference discloses or suggests a process comprising a single polymerization reactor.

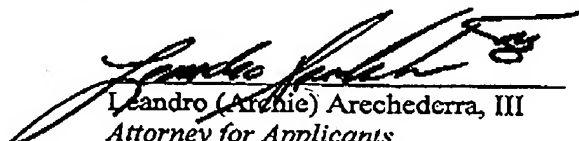
Accordingly, Applicants respectfully submit that Jorgensen-866 in view of Jorgensen-648 fail to render the subject claims obvious. Applicants respectfully request that the rejection be withdrawn.

Applicants respectfully request that all rejections be withdrawn and solicit a prompt notice of allowability. In the alternative, Applicants invite the Office to telephone the undersigned attorney if there are any other issues outstanding which have not been presented to the Office's satisfaction.

Respectfully submitted,

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Date


Leandro (Archie) Arechederra, III
Attorney for Applicants
Registration No. 52,457

Univation Technologies, LLC
5555 San Felipe, Suite 1950
Houston, Texas 77056-2723
Phone: 713-892-3729
Fax: 713-892-3687